

Appl. No. : 09/960,236
Filed : September 20, 2001

REMARKS

Reconsideration and allowance of this application, as amended, is respectfully requested. The Specification has been amended to correct a typographical error. Claims 1-52 were pending in this application prior to entry of the abovementioned amendments. Claims 1-17, 19, 21-32, 34-40, 42 and 44-52 are rejected. Claims 1, 22, 24 and 36 have been amended. No new matter is added by this amendment.

Applicants submit that this application is in condition for allowance and such action is earnestly requested. The Examiner's reasons for rejection are addressed below.

Allowable Claims

Applicants note with appreciation that Claims 18, 20, 33, 41 and 43 are allowed.

Amendments to the claims

Applicants have amended Claims 1, 24 and 36 to clarify the invention. Applicants have amended these claims to recite "an electrode disposed below the pad, wherein the electrode is adapted to receive an electrical potential." These amendments are supported by the application as originally filed, U.S. Patent Publication No. 2002/0121445, at, for example, paragraphs [0045] and [0046], and Fig. 6B.

Original Claim 22 erroneously depended from Claim 6. Claim 22 has been amended to depend from Claim 21. Additionally, Claim 22 has been amended to correct typographical errors.

Section 103 Rejections

Claims 1-3, 6-9, 13-15, 21-24, 27-28, 31-32 and 51-52 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Publication No. 2002/0108861 to Emesh et al. ("Emesh") in view of U.S. Patent No. 6,066,030 to Uzoh ("Uzoh"). Claims 4-5, 10-12, 17, 19, 36-40, 42 and 44-49 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Emesh in view of Uzoh, and further in view of U.S. Patent No. 6,261,426 to Uzoh et al. Claim 16 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Emesh in view of Uzoh, and further in view of U.S. Patent Publication No. 2002/0134748 to Basol et al. ("Basol"). Claim 25 stands rejected

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under 35 U.S.C. §103(a) as being unpatentable over Emesh in view of Uzoh, and further in view of U.S. Patent No. 6,612,915 to Uzoh et al. ("Uzoh'915"). Claims 26 and 29-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Emesh in view of Uzoh and Uzoh'915 patent, and further in view of Basol.

The Examiner has found that Emesh teaches all of the limitations of Claim 1 with the exception that Emesh "does not explicitly teach the claimed feature of 'a width of the at least one channel varies along a length of the at least one channel'." The Examiner has found that Uzoh teaches a polishing pad **19** comprising distribution gaps **21** radiating away from a central region of the polishing pad. *See* Figure 2 of Uzoh. The Examiner has further found that Uzoh "appears to show that the width of the distribution gaps varies along the length of the distribution gaps." The Examiner asserts that "it would have been obvious to one of ordinary skill in the art to have incorporated the distribution gaps of [Uzoh] into the polishing pad of Emesh in order to enhance the distribution of electrolyte [*sic*] as taught by [Uzoh]."

Applicants have amended independent Claims 1, 24 and 36 to clarify than an electrode underlies the pad. Applicants submit that the skilled artisan would not have been motivated, without hindsight, to modify such an electrochemical processing apparatus with the distribution gaps **21** of Uzoh.

The Examiner has stated that the distribution gaps of Uzoh would "enhance the distribution of electrolyte" in Emesh, but has not provided an explanation or a reasoning as to why the skilled artisan would be motivated to employ Uzoh in order to enhance the distribution of electrolyte in Emesh. Initially, as Emesh achieves uniform planarization (*see* Emesh, paragraph [0060]) and recipes for optimizing uniformity (*see* Emesh, paragraph [0048], [0054] and [0055]), the Examiner has attempted to solve a problem where there was none. However, even if the skilled artisan were motivated to enhance the distribution of slurry in Emesh (Applicants are not suggesting that such motivation exists), the skilled artisan would not make the asserted combination without an expectation of success, which the Examiner has not provided. First, the polishing head **1** of Uzoh, which comprises the distribution gaps **21**, is separate from the ECP apparatus **30** of Emesh. Whereas the cathode **50** of Emesh is disposed below the polishing pads **40** (*See* Emesh, Fig. 4 and paragraph [0045]), the cathode of Uzoh is laterally disposed in relation to the polishing head **1** (*See* Uzoh, Fig. 2). The skilled artisan would not replace the grooves **120** of Emesh with the distribution

gaps of **21** of Uzoh because the distribution gaps **21** of Uzoh are not configured to act as a cathode during electropolishing (*See* Uzoh, col 3, line 65 to col. 4, line 23). Rather, Uzoh selects this distribution gap (or channel) configuration (1) for slurry distribution, not electrolyte (which is less viscous); and (2) without any regard for exposure of underlying electrode. Thus, Emesh and Uzoh are directed to controlling different fluids and have different considerations (electrical vs. purely CMP) in selecting their channel shapes.

Second, the distribution gaps **21** of Uzoh are configured to direct slurry from a *single* central slurry port **17**, which contrasts from Emesh in that slurry is distributed through *multiple* apertures **210** and grooves **120** in the polishing head. In fact, it is important to Emesh to employ multiple apertures **210**, since the apertures are configured to expose portions of the cathode **50** (*See* Emesh, Paragraph [0045]), and having multiple apertures **210** provides a uniform electric field across the wafer **60** when a potential is applied between the cathode **50** and the wafer **60**.

Applicants note that it is unclear in the Office Action as to what combination of slurry port **17** and distribution gaps **21** from Uzoh are asserted. If the Examiner has selected a single central slurry port **17** and multiple distribution gaps **21** (as illustrated in Fig. 2 of Uzoh) to combine with Emesh, then the Examiner must provide the motivation for deviating from Emesh's specific teaching of multiple apertures **210**. On the other hand, if the Examiner has selected multiple slurry ports **17** and distribution gaps **21**, there is no indication in Uzoh (or Emesh) that this configuration of slurry ports **17** and distribution gaps **21** of Uzoh would be advantageous when used with multiple apertures **210** of Emesh.

Consequently, as there is no motivation or suggestion to combine Uzoh and Emesh, Applicants respectfully request that the §103 rejection of Claim 1 be withdrawn. As the §103 rejection of Claims 2-17, 19, 21-26, 27-32, 36-40, 42, 44-49 and 51-52 is also based on the combination of Uzoh and Emesh, and without acquiescing in the Examiner's reasons for rejection, Applicants respectfully request that the rejection of Claims 2-17, 19, 21-26, 27-32, 36-40, 42, 44-49 and 51-52 also be withdrawn.

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CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that this application is in condition for allowance and request the same. If there is any further hindrance to allowance of the pending claims, the Examiner is invited to contact the undersigned.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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AMEND

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